The NASA Star and Exoplanet Database

The NStED team
http://nsted.ipac.caltech.edu

NStED Summary

NStED is a general purpose stellar archive to support NASA's planet finding and charactization activities. It currently serves data on 140,000 stars including known exoplanet host stars. Additional tools are provided to derive specific stellar quantities and cross-reference with available extra-solar planetary data for those host stars.

Available Datasets

The database currently serves coronagraphic images from Palomar (such as the image of GJ740 shown at right), template spectra from the N2K consortium, and 40+ published transit lightcurves. Currently being ingested are the TrES Kepler field data (20,000 stars), the Burrell-Optical-Kepler Survey (60,000 stars), and the EXPLORE/OC data (300,000 stars). By the end of 2008, the archive expects to host data from nearly 500,000 stars.
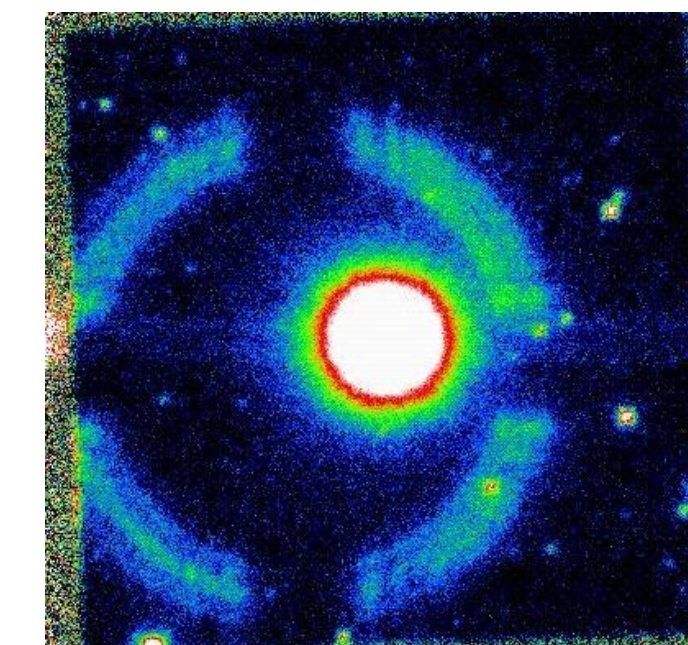
Description of the Database

The archive selects and curates data from published literature as well as data on behalf of astronomers wishing to contribute exoplanet data sets. NStED offers powerful query and download engines, including a unique capability to filter stars by stellar parameters, and a dedicated capability to query the transit data sets. It supports interactive visualization of catalog query results, images and light curves, and on-the-fly calculation of stellar parameters. The user interfaces exploit name resolution and eliminates the ambiguity in multiple star components.

NStED leverages the technical expertise at IPAC. The database and name resolver exploited the NASA Extragalactic Database (NED). The query engines and data interaction services are integrated into the hardware and software architecture of the NASA/IPAC Infrared Science Archive (IRSA).

The figures shown at left and right show examples of the data currently within NStED. These include (clockwise from top-left) the N2K template spectrum of HD 804, the lightcurves of HD 209458 at 0.36 and 24μm, and the lightcurve of the transiting exoplanet TrES-2.

NStED is developing a dedicated interface to support access to lightcurves of stars measured in surveys for transiting exoplanets.
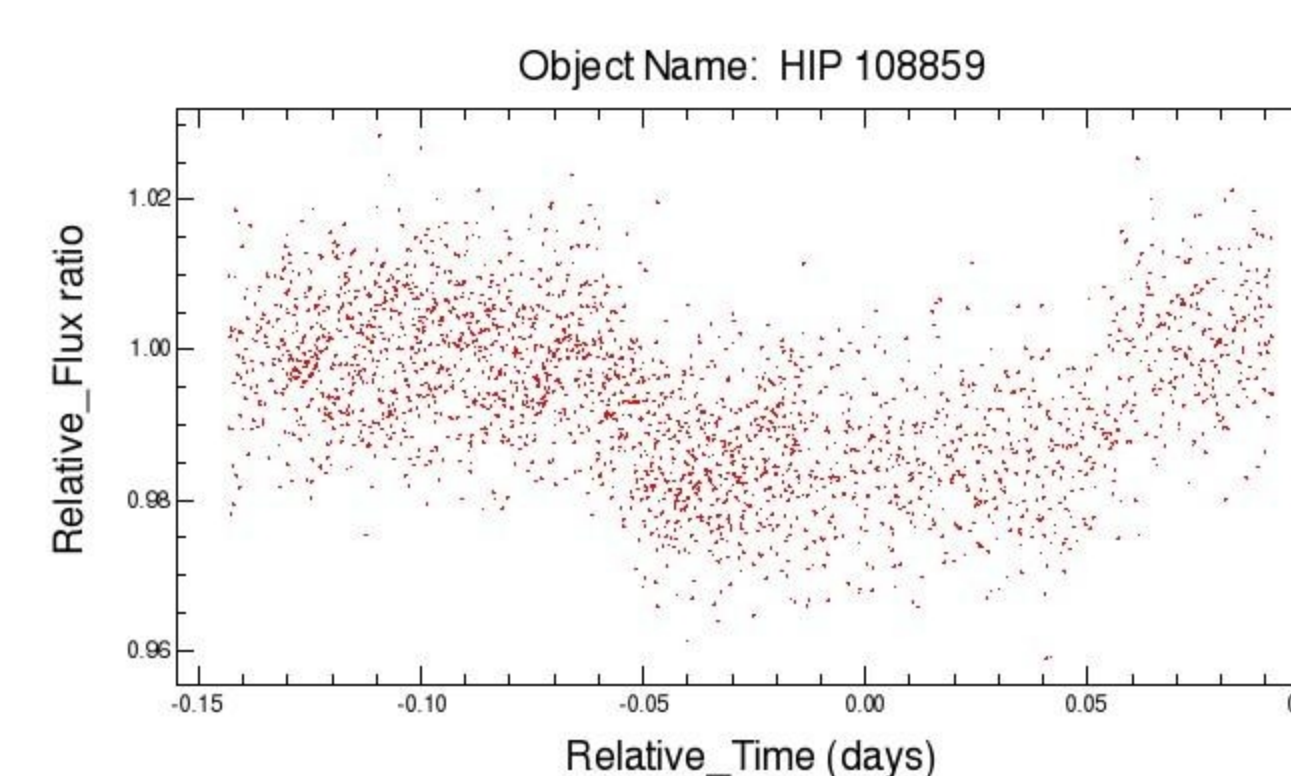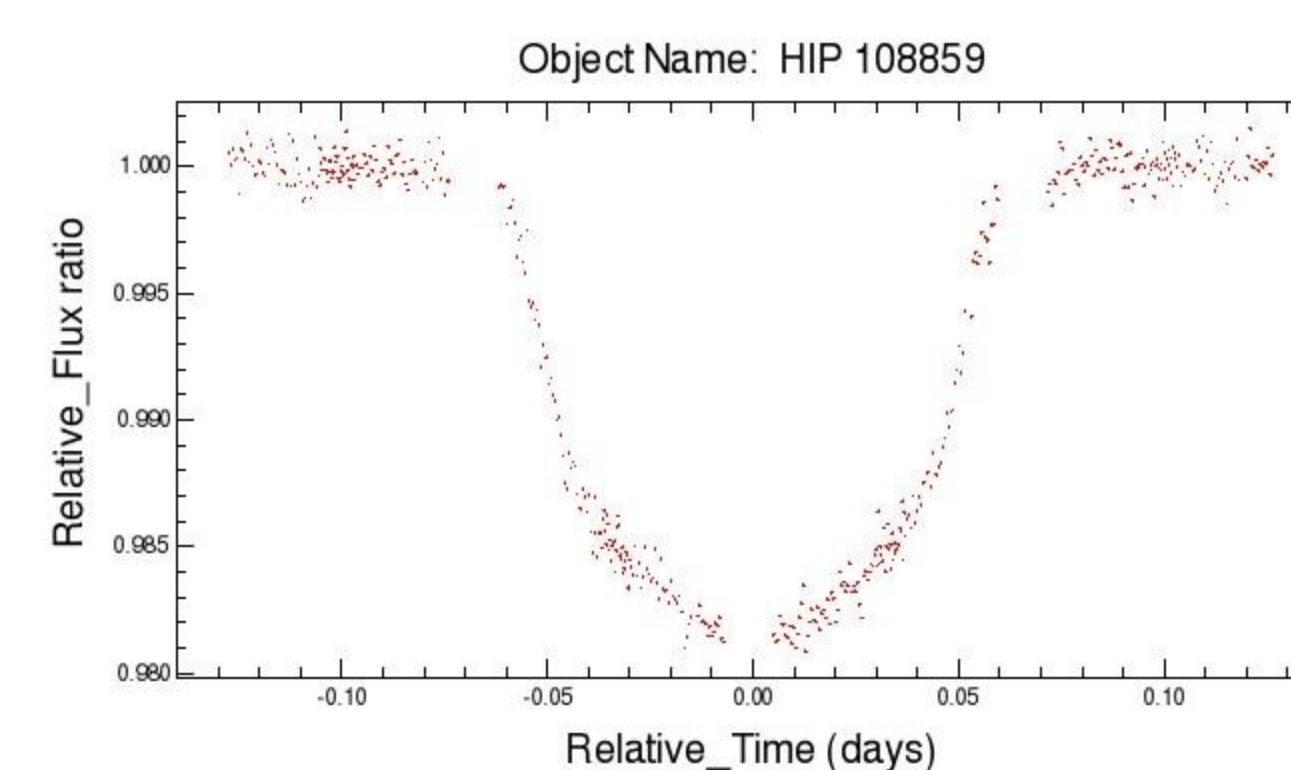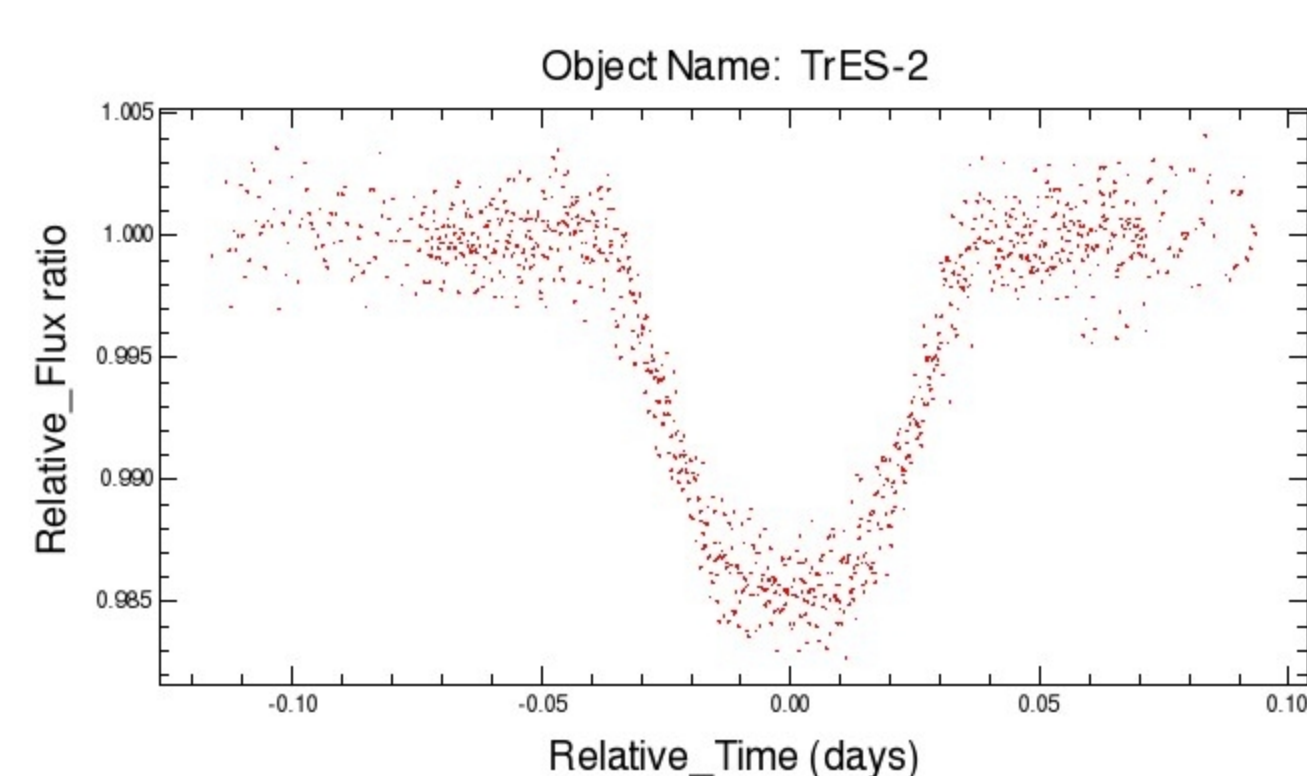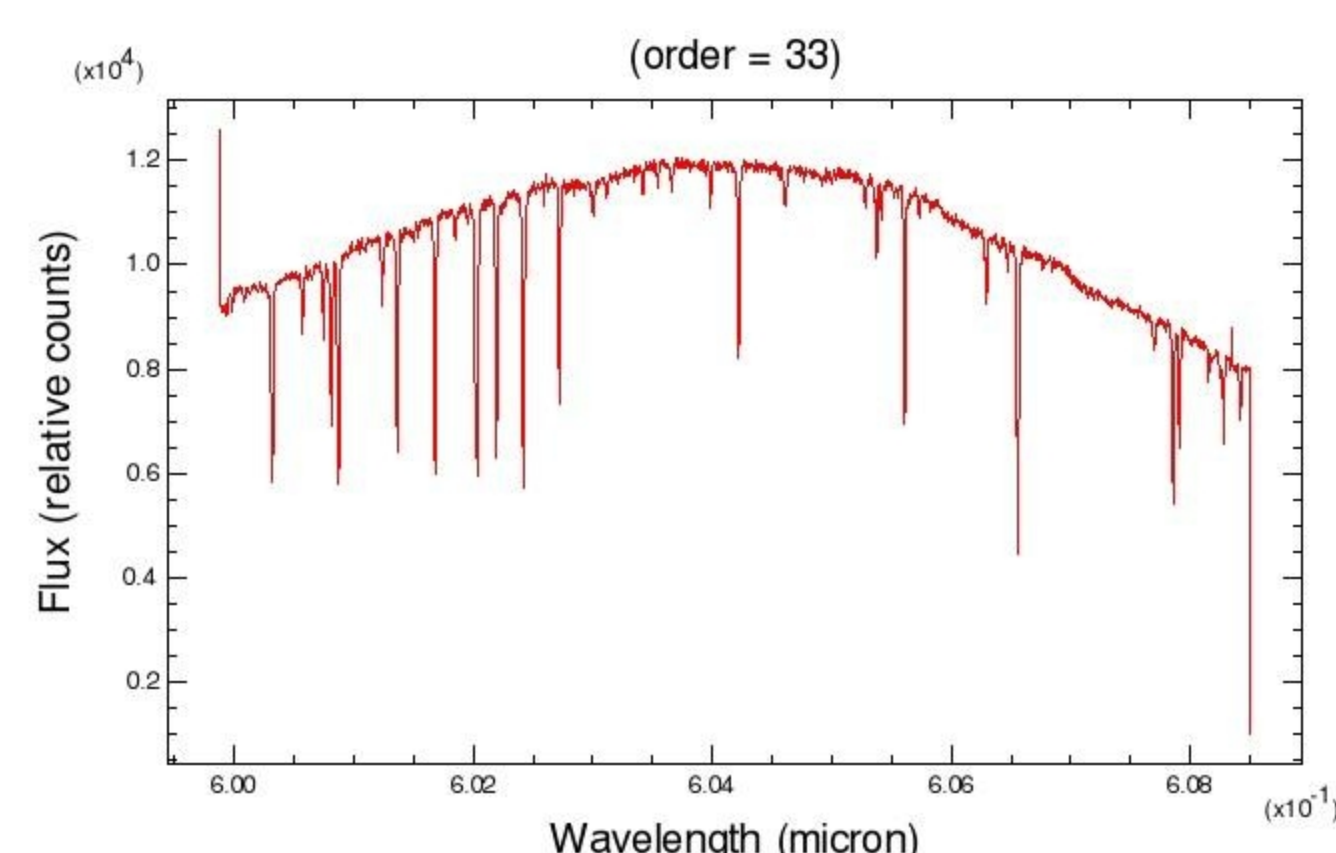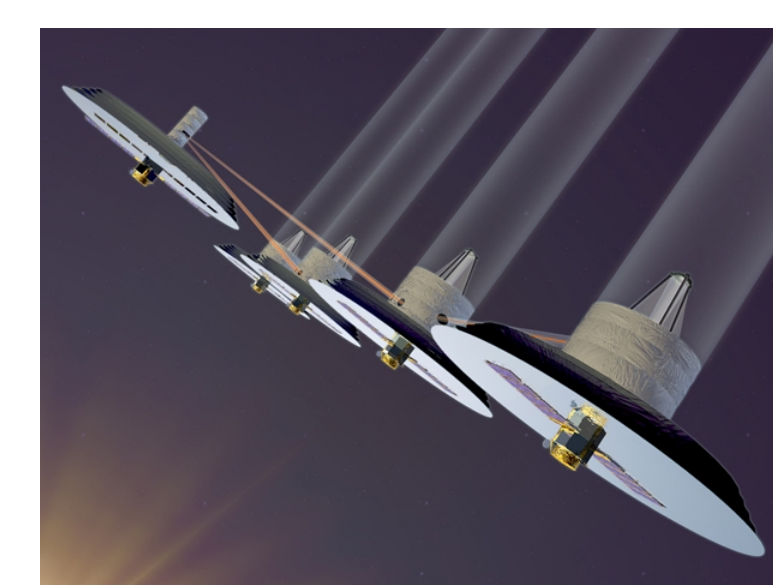
Benefits to NASA and JPL

The stellar and exoplanetary data acquired by ground-based programs are crucial to the success of space-based missions. NStED provides stellar parameters for potential planet bearing stars in addition to exoplanetary parameters for known planet bearing stars. By curating and archiving these data, NStED is supporting future NASA missions to detect and characterize extra-solar planets, such as Kepler, SIM, and TPF.